

**WHAT IS CLAIMED IS:**

1. A compound for increasing the concentration of a parent androgen in a subject in vivo, the parent androgen having a skeletal structure including a 4 position and a 17 position and the parent androgen further having a 17 $\beta$ -hydroxy group comprising a 17 $\beta$ -hydroxy oxygen appended to the 17 position and a 17 $\beta$ -hydroxy hydrogen appended to the 17 $\beta$ -hydroxy oxygen, the compound comprising:
  - a substrate having the skeletal structure of the parent androgen comprising a 4 position and a 17 position corresponding to the 4 and 17 positions respectively of the parent androgen, the substrate comprising a carbon-carbon double bond at the 4 position, the skeletal structure of the parent androgen embodied in the substrate being selected from the group consisting of androst-4-ene-3 $\alpha$ ,17 $\beta$ -diol, androst-4-ene-3 $\beta$ ,17 $\beta$ -diol, and mixtures thereof; and
  - a promoiety appended to the 17 $\beta$ -hydroxy oxygen of the substrate as a substitute for the hydroxy hydrogen of the parent androgen, the promoiety comprising an alkylcarbonate ester.
2. A compound as set forth in claim 1, wherein the alkylcarbonate ester has an alkyl chain length of less than 12.
3. A compound as set forth in claim 1, wherein the compound comprises androst-4-ene-3,17 $\beta$ -diol 17 $\beta$ -alkylcarbonate.
- 20 4. A compound as set forth in claim 1, wherein the compound comprises androst-4-ene-3,17 $\beta$ -diol 17 $\beta$ -ethylcarbonate.

5. A compound as set forth in claim 1, wherein the compound comprises androst-4-ene-3,17 $\beta$ -diol 3,17 $\beta$ -di(alkylcarbonate).

6. A compound as set forth in claim 1, wherein the compound comprises androst-4-ene-3,17 $\beta$ -diol 3,17 $\beta$ -di(ethylcarbonate).

5 7. A compound as set forth in claim 1, further including a carrier.

8. A compound as set forth in claim 1, wherein the carrier comprises a solid carrier.

9. A compound as set forth in claim 1, wherein the carrier comprises a liquid carrier.

10. A compound as set forth in claim 1, wherein the carrier comprises a semi-solid carrier.

11. A compound for increasing the concentration of a parent androgen in a subject in vivo, the parent androgen having a skeletal structure including a 4 position and a 17 position and the parent androgen further having a 17 $\beta$ -hydroxy group comprising a 17 $\beta$ -hydroxy oxygen appended to the 17 position and a 17 $\beta$ -hydroxy hydrogen appended to the 17 $\beta$ -hydroxy oxygen, the compound comprising:  
a substrate having the skeletal structure of the parent androgen comprising a 4 position and a 17 position corresponding to the 4 and 17 positions respectively of the parent androgen, the substrate comprising a carbon-carbon double bond at the 4 position, the skeletal structure of the parent androgen embodied in the substrate

being selected from the group consisting of estr-4-ene-3 $\alpha$ ,17 $\beta$ -diol, estr-4-ene-3 $\beta$ ,17 $\beta$ -diol and mixtures thereof; and  
a promoiety appended to the 17 $\beta$ -hydroxy oxygen of the substrate as a substitute for the hydroxy hydrogen of the parent androgen, the promoiety comprising an alkylcarbonate ester.

12. A compound as set forth in claim 11, wherein the alkylcarbonate ester has an alkyl chain length of less than 12.

13. A compound as set forth in claim 11, wherein the compound comprises estr-4-ene-3,17 $\beta$ -diol 17 $\beta$ -alkylcarbonate.

14. A compound as set forth in claim 11, wherein the compound comprises estr-4-ene-3,17 $\beta$ -diol 17 $\beta$ -ethylcarbonate.

15. A compound as set forth in claim 11, wherein the compound comprises estr-4-ene-3,17 $\beta$ -diol 3,17 $\beta$ -di(alkylcarbonate).

16. A compound as set forth in claim 11, wherein the compound comprises estr-4-ene-3,17 $\beta$ -diol 3,17 $\beta$ -di(ethylcarbonate).

17. A compound as set forth in claim 11, further including a carrier.

18. A compound as set forth in claim 11, wherein the carrier comprises a solid carrier.

19. A compound as set forth in claim 11, wherein the carrier comprises a liquid carrier.

20. A compound as set forth in claim 11, wherein the carrier comprises a semi-solid carrier.

21. A method for increasing the concentration of a parent androgen in a subject in vivo, the parent androgen having a skeletal structure including a 4 position and a 17 position and the parent androgen further having a 17 $\beta$ -hydroxy group comprising a 17 $\beta$ -hydroxy oxygen appended to the 17 position and a 17 $\beta$ -hydroxy hydrogen appended to the 17 $\beta$ -hydroxy oxygen, the method comprising:

administering to the subject a compound comprising a substrate and a promoiety, the substrate having the skeletal structure of the parent androgen comprising a 4 position and a 17 position corresponding to the 4 and 17 positions respectively of the parent androgen, and the substrate comprising a carbon-carbon double bond at the 4 position, the skeletal structure of the parent androgen embodied in the substrate being selected from the group consisting of androst-4-ene-3 $\alpha$ ,17 $\beta$ -diol, androst-4-ene-3 $\beta$ ,17 $\beta$ -diol, and mixtures thereof, the promoiety being appended to the 17 $\beta$ -hydroxy oxygen of the substrate as a substitute for the 17 $\beta$ -hydroxy hydrogen of the parent androgen, the promoiety comprising an alkylcarbonate ester; and

converting the compound in vivo into the parent androgen.

22. A method as set forth in claim 21, wherein the subject is a human being and the in vivo conversion comprises converting the compound into the parent androgen in vivo within the human being.

23. A method as set forth in claim 21, wherein the compound comprises androst-4-ene-3,17 $\beta$ -diol 17 $\beta$ -alkylcarbonate.

24. A method as set forth in claim 21, wherein the compound comprises androst-4-ene-3,17 $\beta$ -diol 17 $\beta$ -ethylcarbonate.

5 25. A method as set forth in claim 21, wherein the compound comprises androst-4-ene-3,17 $\beta$ -diol 3,17 $\beta$ -di(alkylcarbonate).

26. A method as set forth in claim 21, wherein the compound comprises androst-4-ene-3,17 $\beta$ -diol 3,17 $\beta$ -di(ethylcarbonate).

10 27. A method as set forth in claim 21, wherein the compound administration comprises peroral administration.

28. A method as set forth in claim 21, wherein the compound administration comprises pernasal administration.

29. A method as set forth in claim 21, wherein the compound administration comprises transdermal administration.

15 30. A method as set forth in claim 21, wherein the compound administration comprises injecting the compound into the subject.

31. A method as set forth in claim 21, wherein the compound administration comprises administering the compound sublingually.

32. A method as set forth in claim 21, wherein the compound administration comprises complexing the compound with an hydroxypropyl beta cyclodextrin.

33. A method as set forth in claim 21, wherein the compound administration comprises complexing the compound with an hydroxypropyl gamma cyclodextrin.

34. A method as set forth in claim 21, wherein the compound administration comprises administering a dosage periodically for a maximum of two weeks, followed by at least two weeks of non-administration to permit recovery of natural parent androgen production in the subject.

35. A method as set forth in claim 21, wherein the compound administration comprises administering the compound only in morning-time.

36. A method as set forth in claim 21, wherein the compound administration comprises administering the compound in an amount ranging from 1.0 mg to 500 mg per day.

37. A method as set forth in claim 21, wherein the compound administration comprises administering the compound in an amount ranging from 50 mg to 300 mg per day.

38. A method as set forth in claim 21, wherein the compound administration comprises administering the compound in an amount ranging from 50 mg to 100 mg per day.

39. A method as set forth in claim 21, wherein the compound administration further includes applying an enteric coating to the compound prior to administering the compound.

40. A method for increasing the concentration of a parent androgen in a subject in vivo, the parent androgen having a skeletal structure including a 4 position and a 17 position and the parent androgen further having a  $17\beta$ -hydroxy group comprising a  $17\beta$ -hydroxy oxygen appended to the 17 position and a  $17\beta$ -hydroxy hydrogen appended to the  $17\beta$ -hydroxy oxygen, the method comprising:

5 administering to the subject a compound comprising a substrate and a promoiety, the substrate having the skeletal structure of the parent androgen comprising a 4 position and a 17 position corresponding to the 4 and 17 positions respectively of the parent androgen, and the substrate comprising a carbon-carbon double bond at the 4 position, the skeletal structure of the parent androgen embodied in the substrate being selected from the group consisting of estr-4-ene-3 $\alpha$ ,17 $\beta$ -diol, estr-4-ene-3 $\beta$ ,17 $\beta$ -diol, and mixtures thereof, the promoiety being appended to the  $17\beta$ -hydroxy oxygen of the substrate as a substitute for the  $17\beta$ -hydroxy hydrogen of the parent androgen, the promoiety comprising an alkylcarbonate ester; and

10 converting the compound in vivo into the parent androgen.

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41. A method as set forth in claim 40, wherein the subject is a human being and the in vivo conversion comprises converting the compound into the parent androgen in vivo within the human being.

20 42. A method as set forth in claim 40, wherein the compound comprises estr-4-ene-3,17 $\beta$ -diol 17 $\beta$ -alkylcarbonate.

43. A method as set forth in claim 40, wherein the compound comprises estr-4-ene-3,17 $\beta$ -diol 17 $\beta$ -ethylcarbonate.

44. A method as set forth in claim 40, wherein the compound comprises estr-4-ene-3,17 $\beta$ -diol 3,17 $\beta$ -di(alkylcarbonate).

5 45. A method as set forth in claim 40, wherein the compound comprises estr-4-ene-3,17 $\beta$ -diol 3,17 $\beta$ -di(ethylcarbonate).

46. A method as set forth in claim 40, wherein the compound administration comprises peroral administration.

10 47. A method as set forth in claim 40, wherein the compound administration comprises pernasal administration.

48. A method as set forth in claim 40, wherein the compound administration comprises transdermal administration.

15 49. A method as set forth in claim 40, wherein the compound administration comprises injecting the compound into the subject.

50. A method as set forth in claim 40, wherein the compound administration comprises administering the compound sublingually.

51. A method as set forth in claim 40, wherein the compound administration comprises complexing the compound with an hydroxypropyl beta cyclodextrin.

52. A method as set forth in claim 40, wherein the compound administration comprises complexing the compound with an hydroxypropyl gamma cyclodextrin.

53. A method as set forth in claim 40, wherein the compound administration comprises administering a dosage periodically for a maximum of two weeks, followed by at least two weeks of non-administration to permit recovery of natural parent androgen production in the subject.

54. A method as set forth in claim 40, wherein the compound administration comprises administering the compound only in morning-time.

10 55. A method as set forth in claim 40, wherein the compound administration comprises administering the compound in an amount ranging from 1.0 mg to 500 mg per day.

15 56. A method as set forth in claim 40, wherein the compound administration comprises administering the compound in an amount ranging from 50 mg to 300 mg per day.

57. A method as set forth in claim 40, wherein the compound administration comprises administering the compound in an amount ranging from 50 mg to 100 mg per day.

20 58. A method as set forth in claim 40, wherein the compound administration further includes applying an enteric coating to the compound prior to administering the compound.